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# Funding Opportunities for Balloon Technologies

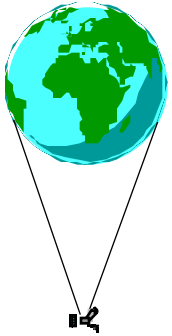
Dr. Peter Ulrich

Advanced Technology and Mission Studies Division  
Office of Space Science

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***Second ULDB Technology Workshop  
November 12, 1998***



# **Cross-Enterprise Technology Development Program (CETDP)**

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**The NASA Cross-Enterprise Technology Development Program  
develops critical space technologies that lower cost, improve  
performance and enable new missions**

**Cross-Enterprise technology is long-range strategic technology  
that has broad potential to span the needs of more than one  
Enterprise**

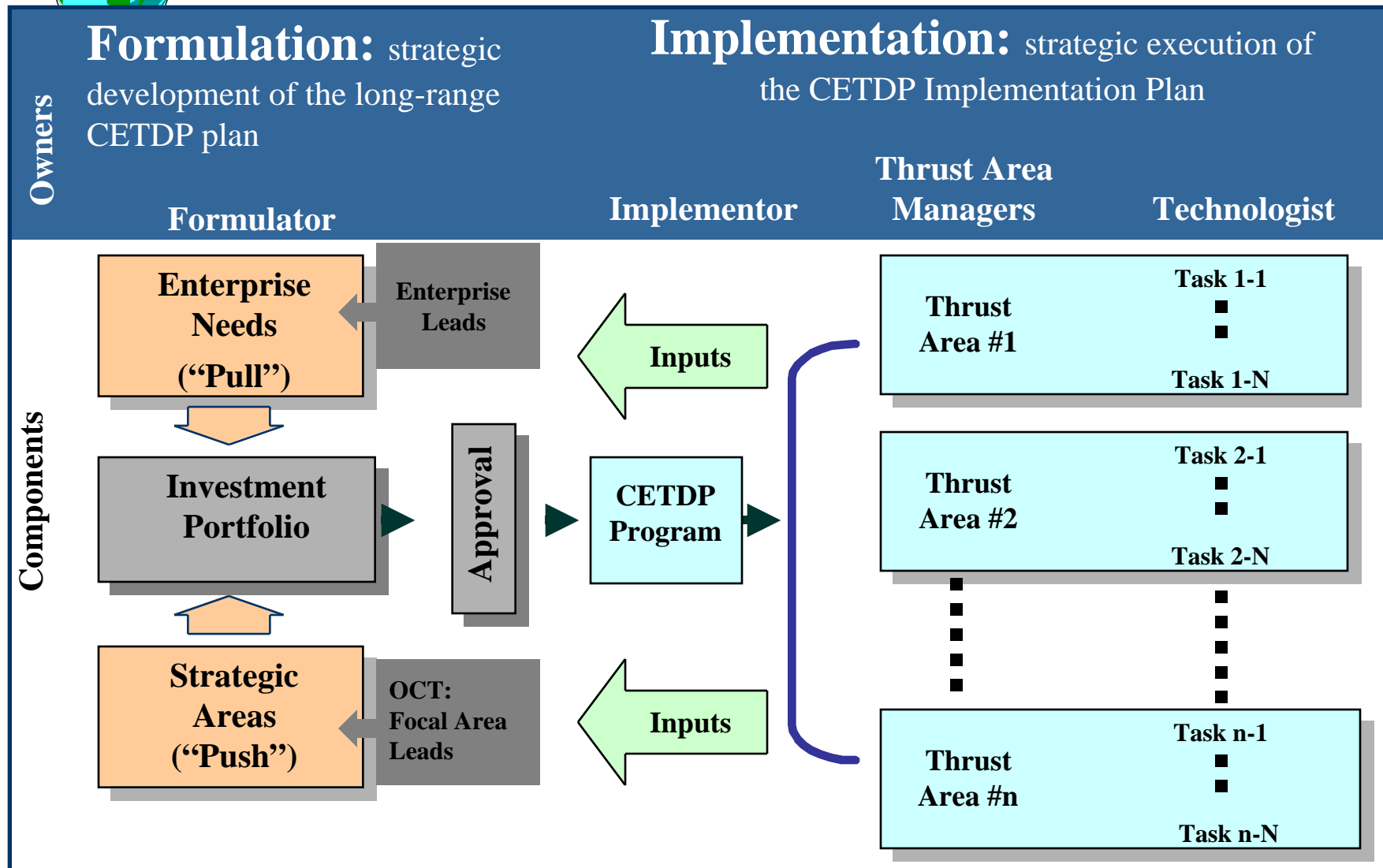
**Program Focus: Low TRLs (Primarily 1-3)**

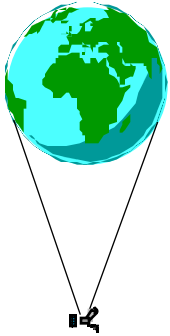
**TRLs 4-6 supported in CETDP through joint funding**

**Primary Customers: ESE, HEDS, SSE, and OCT**



# CETDP Program Overview

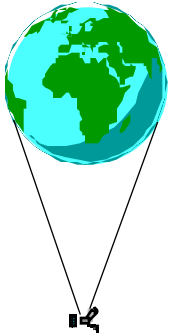




# CETDP Thrust Areas

Proposed Initial Thrust Areas	Thrust Area Manager	TAM Locations and Principal Participants
Advanced Power and Propulsion	Joe Sovie*	<b>LeRC</b> , JPL, MSFC
<b>Breakthrough Sensors and Instrument Component Technology</b>	Gary Parks*	<b>JPL</b> , GSFC, JSC, LaRC
Distributed Spacecraft Control	Kate Hartman*	<b>GSFC</b> , JPL, ARC
High-Rate Knowledge Delivery	Jim Bagwell*	<b>LeRC</b> , GSFC, JSC, ARC, JPL
Thinking Space Systems	Peter Norvig	<b>ARC</b> , JPL, GSFC
Micro/Nano Sciencecraft	Kim R.Reh*	<b>JPL</b> , GSFC, ARC
Next Generation Infrastructure	ON HOLD	<b>LaRC</b> , all centers
Surface Systems	Satish.K.Khanna	<b>JPL</b> , JSC
<b>Ultralight Structures and Space Observatories</b>	* <b>Chris Moore</b>	<b>LaRC</b> , JPL, GSFC, MSFC
Ultra-Survivable Systems	ON HOLD	<b>TBD (JSC?)</b>

\* Acting

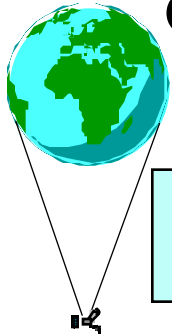


# Next Steps

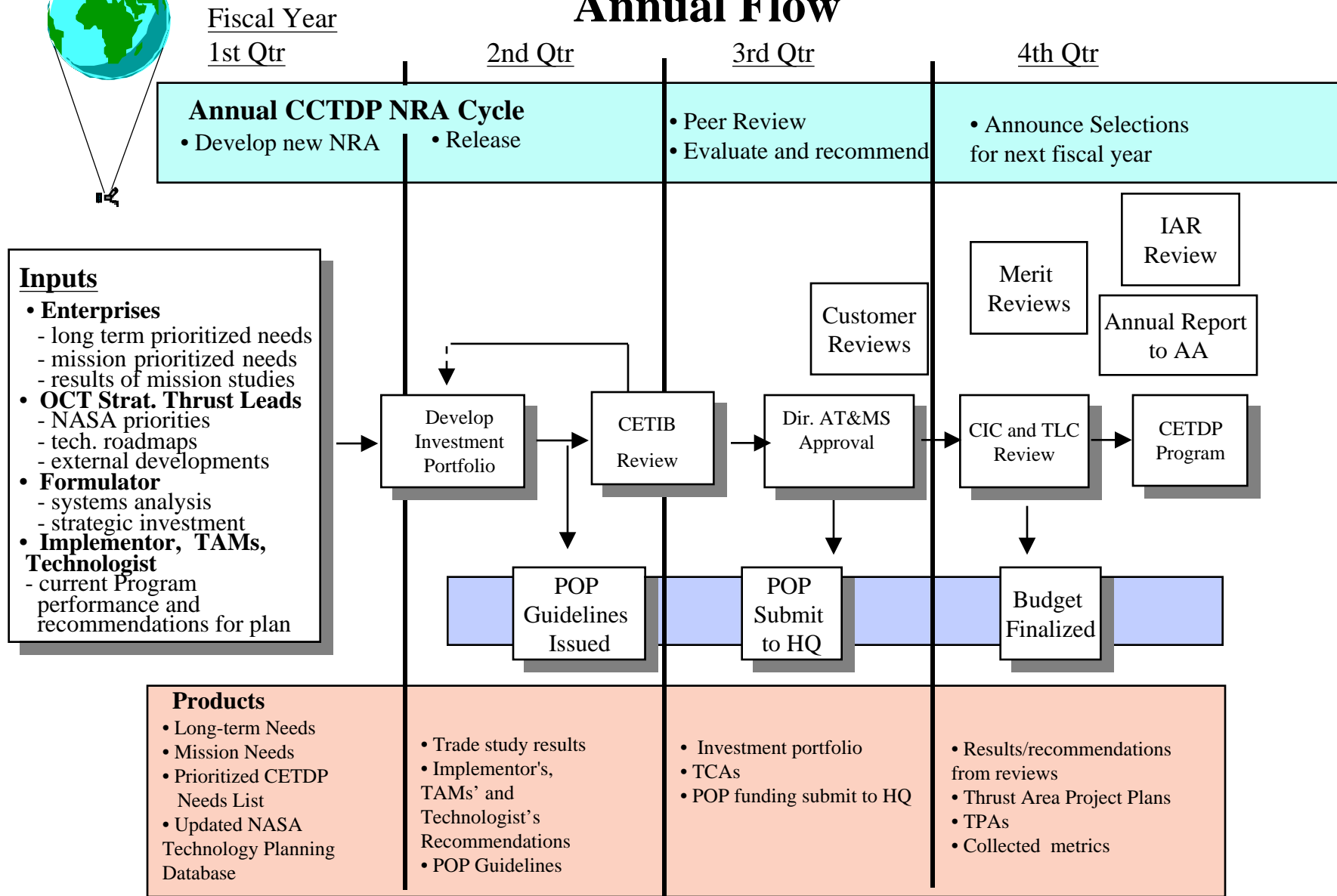
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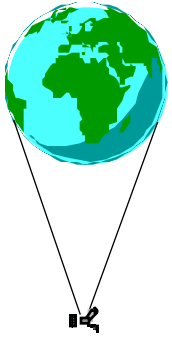
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- Relate ULDB Tech Roadmap needs (Balloon, Trajectory Control, Power, Comm, Thermal, Pointing, Termination Systems, Robust Launch, Balloon FOV, Operations Autonomy, hardening,...) to the CETDP Thrust Areas
- Contact TAMs for guidance and clarification
- Coordinate Requirements with Enterprise Level 1 Inputs to CETDP Formulator



# Cross Enterprise Technology Development Program Annual Flow





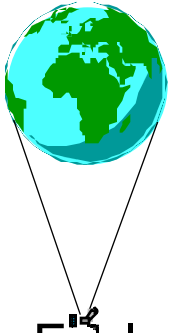
# “Advanced Technology Development for NASA Science Missions” NRA

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## CETDP NRA

- **CBD Nov.'98 -- draft on Web Nov 20th at <http://www.hq.nasa.gov/office/oss/research.htm>)**
- **Over \$20 M per year, issued annually**
- **Draft Comments due December 18, 1998**
- **NRA official release in Feb '99**
- **Awards 4th Q FY99**
- **Outside proposals only this year**  
**No NASA(JPL) PIs or Co-Is**



## Explorer Technology Program Concept and Approach Technology Readiness Levels 4 to 6

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Explorer Program AOs now include LDB and “Missions of Opportunity”

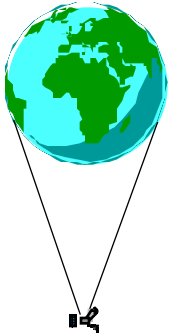
The diversity of the Explorer Program requires the development of a flexible, responsive technology initiative

To effectively address programmatic needs, a three pronged approach is suggested:

- ¶ Explorer Technology (**ET**) NRA -- an open call to the engineering and scientific communities, competitively reviewed
- Science Instrument Supporting Technology (**SIST**) -- support to advance science instruments, AO Category 3 proposals
- Partnering Opportunities (**POpp**) -- Bridge funding and Program discretionary funding

Planned \$6M/yr. funding breakdown: ~**ET: 30%, SIST: 60%, POpp 10%**





## **Technology Development for NASA Explorer Missions and SOFIA NRA Issued 10/23/98 -- NOI Due 11/23/98 -- Proposals due 1/22/99**

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Traditional NASA support path for new technologies proposed from the broad based community

**Purpose:** To tap the creativity of the engineering and science communities in Instruments, Optics, Data Systems, & GN&C.

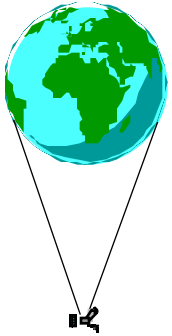
**Process:** Open NRA, Peer Reviewed

NRA Topics generated based on recommendations from the Explorer Program Technology Panel

Aligned with the Enterprise Strategic needs

**NRA Funding Level:** ~\$3-4M (With STP, SOFIA, etc.) total per year, up to \$300K per year per proposal, with 2-year proposals.

See <http://www.hq.nasa.gov/office/oss/nra/98-oss-10/>



## Technology Development for NASA Explorer Missions and SOFIA NRA Content

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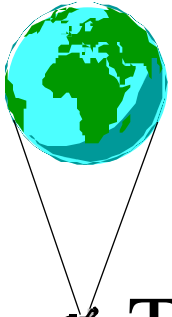
The technology must explicitly address a need of the Explorer Program as defined in the NRA:

“This NRA is an OSS cross-theme effort to identify and support investigations that are likely to enhance the scientific capabilities and reduce cost of future Explorer missions, **including Long Duration Balloon (LDB) flights.**”

“Although this opportunity is not mission-specific, it is strongly advised that the proposal identify plausible future missions that might be proposed in response to Explorer opportunities, **including Long Duration Balloon (LDB) missions.**”

“Proposers are encouraged to seek separate arrangements to demonstrate the technical maturity of their investigations via high-fidelity test environments such as demonstration flights through the New Millennium Program (NMP), suborbital missions (sounding rockets, **balloons**, or aircraft such as SOFIA), and/or instrumentation for ground-based astronomical observations.”

The technology must show application across multiple systems or missions --  
Applicability to both Explorers and LDB might get higher rating by peer review.



# Conclusions

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- There are opportunities to begin funding ULDB programs
- There are also well-defined processes to do so
- The ULDB community now needs to build on the groundwork developed thus far to coordinate and develop science consensus, to participate in the NRA programs and to flow down technology needs to the CETDP